What is claimed is:

1. A computer-assisted diagnosis method for assisting diagnosis of anatomical structures in a digital volumetric medical image of at least one lung, comprising the steps of:

identifying an anatomical structure of interest in the volumetric digital medical image;

automatically segmenting, in real-time, the anatomical structure of interest in a predefined volume of interest (VOI);

automatically computing, in real-time, quantitative measurements of the anatomical structure of interest;

displaying, in real-time, a result of said segmenting step and a result of said computing step;

estimating, in real-time, a likelihood that the anatomical structure of interest corresponds to a disease or an area warranting further investigation, based on predefined criteria and the quantitative measurements; and

generating, in real-time, a warning, when the likelihood is above a predefined threshold.

2. The method according to claim 1, wherein said generating step comprises the step of rendering a visual confidence bar.

3. The method according to claim 1, wherein said generating step comprises the step of creating an audible signal.

4. The method according to claim 1, wherein said displaying step comprises the step of rendering a colored, three-dimensional representation of the anatomical structure of interest, with background structures, if any, rendered in contrasting colors with respect to the anatomical structure of interest.

5. The method according to claim 1, wherein the quantitative measurements comprise at least some of a diameter, a volume, a sphericity, a circularity, and an average intensity of the anatomical structure of interest.

6. The method according to claim 1, wherein said identifying step is performed manually by a user.

7. The method according to claim 1, wherein said identifying step is performed automatically.

8. The method according to claim 1, wherein there is more than one anatomical structure of interest, and said method further comprises the step of repeating said segmenting, displaying, estimating, and generating steps, to

examine each of the more than one anatomical structure of interest one of sequentially and randomly.

9. The method according to claim 8, wherein the more than one anatomical structure of interest is displayed with an n of m label, n representing a currently examined anatomical structure of interest and m representing a total number of the more than one anatomical structure of interest.

10. The method according to claim 1, wherein said computing step comprises the step of executing a segmentation method that adaptively adjusts segmentation thresholds based on local histogram analysis to determine an extent of the structural object of interest.

11. The method according to claim 1, wherein said segmenting and computing steps are performed substantially instantaneously.

12. The method according to claim 1, further comprising the step of generating a graphical user interface having a main window for displaying at least one view corresponding to the at least one lung.

13. The method according to claim 12, wherein the at least one view is at least one of an axial view and a maximum intensity projection view.

14. The method according to claim 12, further comprising the step of displaying at least one of the result of said segmenting step and the result of said computing step in a supplemental window or a pop-up window of the graphical user interface.

15. The method according to claim 12, further comprising the step of alternately displaying at least one of at least two different sets of display parameters in a supplemental window of the graphical user interface to view an extent of calcification of the anatomical structure of interest.

16. The method according to claim 12, further comprising the steps of:

determining a local spinning plane for the anatomical structure of interest, the local spinning plane being centered at a centroid and a local spinning axis of the anatomical structure of interest;

rotating the local spinning plane at least a portion of 360 degrees;

creating a view of the anatomical structure of interest at predefined increments of rotation, so as to result in a

plurality of views of the anatomical structure of interest; and

displaying the plurality of views of the anatomical structure of interest in a supplemental window of the graphical user interface.

17. The method according to claim 12, wherein there is more than one anatomical structure of interest, and said method further comprises the step of conducting a tour of the more than one anatomical structure of interest, said conducting step comprising the steps of:

displaying results of said segmenting and computing steps in at least one supplemental window or at least one pop-up window of the graphical user interface; and

receiving indicia for selecting a previous anatomical structure of interest, a next anatomical structure of interest, and a particular anatomical structure of interest from among the more than one anatomical structure of interest.

18. An interactive computer-aided diagnosis system for assisting detection and diagnosis of lung nodules in a digital volumetric medical image of at least one lung, comprising:

a selection device for identifying an anatomical structure of interest in the volumetric digital medical image;

a segmentation device for automatically segmenting, in real-time, the anatomical structure of interest in a predefined volume of interest (VOI),

a measurement device for computing, in real-time, quantitative measurements of the anatomical structure of interest;

a display device for displaying, in real-time, a result of said segmentation device and a result of said measurement device;

a likelihood estimator for estimating, in real-time, a likelihood that the anatomical structure of interest corresponds to a disease or an area warranting further investigation, based on predefined criteria and the quantitative measurements; and

a warning generator for generating, in real-time, a warning, when the likelihood is above a predefined threshold.

19. The system according to claim 18, wherein said display device displays a visual confidence bar in response to the warning generated by said warning generator.

20. The system according to claim 18, further comprising an audio signal generator for generating an audible signal in response to the warning generated by said warning generator.

21. The system according to claim 18, wherein said display device, in response to the warning generated by said warning generator, generates a colored, three-dimensional representation of the anatomical structure of interest, with background structures, if any, rendered in contrasting colors with respect to the anatomical structure of interest.

22. The system according to claim 18, wherein said display device displays various views of the anatomical structure of interest using a graphical user interface.

23. The system according to claim 18, wherein said segmenting device and computing device respectively segment the anatomical structure of interest and compute the quantitative measurements of the anatomical structure of interest substantially instantaneously.

24. The system according to claim 18, wherein said display device generates a graphical user interface having a main window for displaying at least one view corresponding to the at least one lung.

25. The system according to claim 24, wherein the at least one view is at least one of an axial view and a maximum intensity projection view.

26. The system according to claim 24, wherein said display device displays at least one of the result of said segmenting step and the result of said computing step in a supplemental window or a pop-up window of the graphical user interface.

27. The system according to claim 24, wherein said display device alternately displays at least one of at least two different sets of display parameters in a supplemental window of the graphical user interface to view an extent of calcification of the anatomical structure of interest.

28. The system according to claim 24, wherein the graphical user interface comprises a menu for selecting a previous anatomical structure of interest, a next anatomical structure of interest, and a particular anatomical structure of interest from among more than one anatomical structure of interest identified either automatically or manually.

29. The system according to claim 24, further comprising a storage device, wherein the graphical user interface comprises a menu for retrieving previously stored structures of interest from said storage device and for saving newly identified structures of interest from said storage device.

30. The system according to claim 24, wherein the graphical user interface further comprises a selector for removing one of an index and a visual mark of a current anatomical structure of interest and any quantitative measurements corresponding thereto from a list corresponding to previously stored anatomical structures of interest.

31. The system according to claim 18, further comprising a nodule determination device for determining whether the anatomical structure of interest is a lung nodule, based on the likelihood.

32. The system according to claim 18, further comprising a user override device, for overriding a result of said nodule determination device.

33. The system according to claim 18, wherein the graphical user interface comprises at least one visualization tool for application to the anatomical structure of interest.

34. A computer-assisted diagnosis method for assisting diagnosis of anatomical structures in a digital volumetric medical image of at least one lung, comprising the steps of:

receiving, in real-time, indicia indicating a position of interest within a volume of interest (VOI) of the digital volumetric medical image;

automatically segmenting, in real-time, an anatomical structure of interest in the VOI corresponding to the position;

automatically computing, in real-time, quantitative measurements of the anatomical structure of interest;

displaying, in real-time, a result of said segmenting step and a result of said computing step;

generating, in real-time, a warning, when the anatomical structure of interest is determined to be potentially adverse based on predefined criteria and the quantitative measurements; and

generating, in real-time, a warning, based on an adverse result of said determining step.